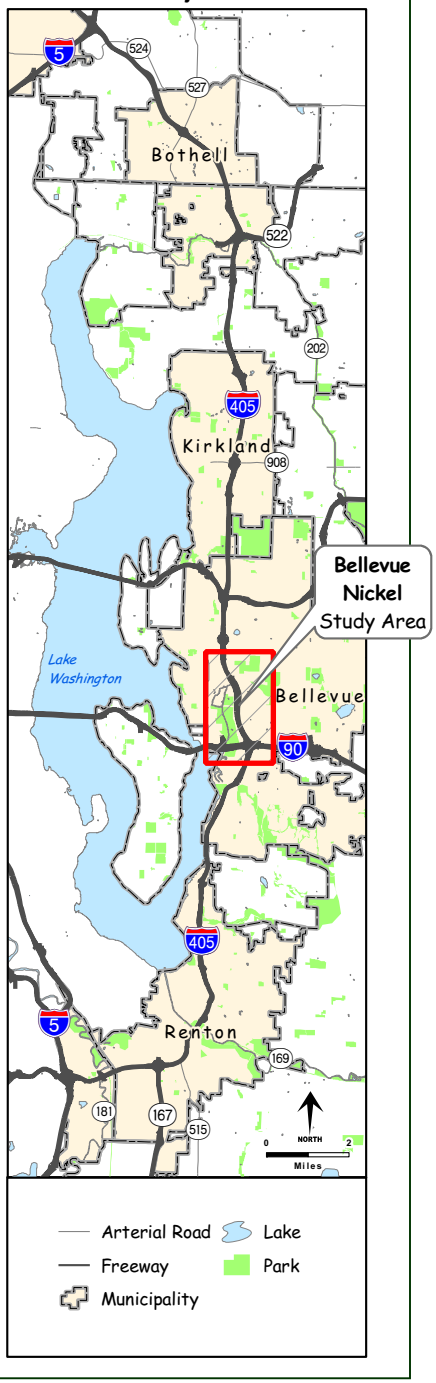
I-405 Bellevue Nickel Improvement Project
I-90 to Southeast 8th Street

INTERSTATE 405 Corridor Program
Congestion Relief & Bus Rapid Transit Projects

TRAFFIC AND TRANSPORTATION
DISCIPLINE REPORT

January 2006

I-405 Project Area



Washington State Department of Transportation

U.S. Department of Transportation
Federal Highway Administration

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Glossary

access	The ability to enter or approach a facility or to make use of a facility.
arterial	A major street that primarily serves through traffic, but also provides access to abutting properties. Arterials are often divided into principal and minor classifications depending on the number of lanes, connections made, volume of traffic, nature of traffic, speeds, interruptions (access functions), and length.
bicycle lane	A portion of a roadway reserved for preferential or exclusive use by bicycles through striping, signs, and pavement markings.
best management practice (BMP)	BMPs are generally accepted techniques that, when used alone or in combination, prevent or reduce adverse effects of a project. Examples include erosion control measures and construction management to minimize traffic disruption. Please see Appendix A for a complete list of BMPs.
bottleneck	A narrow or obstructed section of a highway; a point or an area of traffic congestion.
capacity	The maximum sustained traffic flow of a transportation facility under prevailing traffic and roadway conditions in a specified direction.
congestion	A condition characterized by unstable traffic flows that prohibit movement on a transportation facility at optimal legal speeds. Recurring congestion is caused by regularly occurring excess volume compared with capacity. Nonrecurring congestion is caused by unusual or unpredictable events such as traffic accidents.
Corsim	An intersection operations simulation software package that represents operating conditions and the effect of design modifications on the affected environment.
delay	Increased travel time experienced by a person or a vehicle because of circumstances that impede the desirable movement of traffic.
demand	The desire for travel by potential users of the transportation system.
emergency vehicle	Any vehicle used to respond to an incident or accident. Examples include police cars, fire engines, ambulances, tow trucks, and maintenance vehicles.
general-purpose (GP) lane	A freeway or arterial lane available for use by all traffic.
Growth Management Act (GMA)	Washington State legislation passed in 1990 and subsequently amended that requires long-range comprehensive plans prepared by cities and counties to be balanced with supporting transportation infrastructure (RCW 36.70A).
high-occupancy vehicle (HOV)	Vehicle that carries two or more people, including buses, vanpools, and carpools.

Glossary

jurisdiction	A municipal government agency, such as a city or county. As appropriate, the term "jurisdiction" also includes federal and state agencies and federally recognized tribes.
level of service (LOS)	A measure of system operating performance for roadways, transit, non-motorized, and other transportation modes. For example, roadway measures of level of service often assign criteria based on volume-to-capacity ratios.
measure of effectiveness	A term used to assess how a roadway performs.
mode split	A particular means of travel. Typically, transportation modes include driving alone (SOV), carpooling (HOV), non-motorized (walking, jogging, biking), or riding transit or high-capacity transit (light rail or commuter rail). Mode split is the percentage of each mode type that vehicles or persons are using for travel.
modeling	Use of statistics and mathematical equations to simulate and predict real events and processes.
non-motorized	Bicycle, pedestrian, and other modes of transportation not involving a motor vehicle.
off-peak direction	Travel direction of the freeway with the lower demand.
park-and-ride facility	A facility where individuals can park their vehicle for the day and access public transportation or rideshare for the major portion of their trip.
peak direction	Travel direction of the freeway with the higher demand and more congestion.
peak hour	The hour in the morning and in the afternoon when the maximum demand occurs on a given transportation facility or corridor.
peak period	The period of the day during which the maximum amount of travel occurs. We may specify the morning (AM), or the afternoon or evening (PM) peak.
person trips	The total number of persons who pass through a section of roadway over a given time. For example, one vehicle carrying two people comprises two person trips, or one bus that carries 20 people comprises 20 person trips.
Puget Sound Regional Council (PSRC)	The Metropolitan Planning Organization (MPO) and Regional Transportation Planning Organization (RTPO) for the Central Puget Sound region, which is comprised of Snohomish, King, Pierce, and Kitsap Counties. The MPO and RTPO is the legally mandated forum for cooperative transportation decision-making in a metropolitan planning area.

Glossary

queue	A line of vehicles waiting to move through an access point in traffic, such as a signal or turn lane.
ramp metering	A system used to reduce congestion on a freeway facility by managing vehicle flow from local-access on-ramps. An on-ramp is equipped with a traffic signal that allows vehicles to enter the freeway at predetermined intervals.
single-occupancy vehicle (SOV)	A vehicle with only one occupant (i.e., the driver).
State Environmental Policy Act (SEPA)	State legislation passed in 1974, which establishes an environmental review process for all development projects and major planning studies prior to taking any action on these projects. SEPA includes early coordination to identify and mitigate any issues or effects that may result from a project or study.
Synchro	A software application for optimizing traffic signal timing and performing capacity analysis. The software optimizes splits, offsets, and cycle lengths for individual intersections, an arterial, or a complete network.
throughput	Describes the number of vehicles carried on a facility. We usually measure throughput at a specific point on the roadway facility for a predetermined period of time.
travel demand forecasting	Procedures for determining the desire for travel by potential users of the transportation system, including the number of travelers, the time of day, and travel routes.
vanpool	A prearranged ridesharing function in which a number of people travel together on a regular basis in a van, usually designed to carry five or more persons.
vehicle	Any car, truck, van, motorcycle, or bus designed to carry passengers or goods.
vehicle trips	The total number of vehicles that pass through a section of roadway over a given time.
Vissim	Software used for the modeling and simulation of transportation systems.

Acronyms and Abbreviations

A.M.	morning
BMPs	best management practices
BNSF	Burlington Northern Santa Fe
EA	environmental assessment
EIS	environmental impact statement
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GP	general purpose
HAL	high-accident location
HOV	high-occupancy vehicle
HOV 2+	high-occupancy vehicle requirement of two or more persons per vehicle
HOV 3+	high-occupancy vehicle requirement of three or more people
I-405	Interstate 405
I-90	Interstate 90
LOS	level of service
NB	northbound
NEPA	National Environmental Policy Act
P.M.	afternoon
PSRC	Puget Sound Regional Council
ROD	record of decision
SB	southbound
SE	southeast
SOV	single-occupancy vehicle
SR	state route
TMP	traffic management plan
WSDOT	Washington State Department of Transportation

Introduction

In 1998, the Washington State Department of Transportation (WSDOT) joined with the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), Central Puget Sound Regional Transit Authority (Sound Transit), King County, and local governments in an effort to reduce traffic congestion and improve mobility in the Interstate 405 (I-405) corridor. In fall 2002, the combined efforts of these entities culminated in the *I-405 Corridor Program Final Environmental Impact Statement (EIS)* and *FHWA Record of Decision (ROD*).

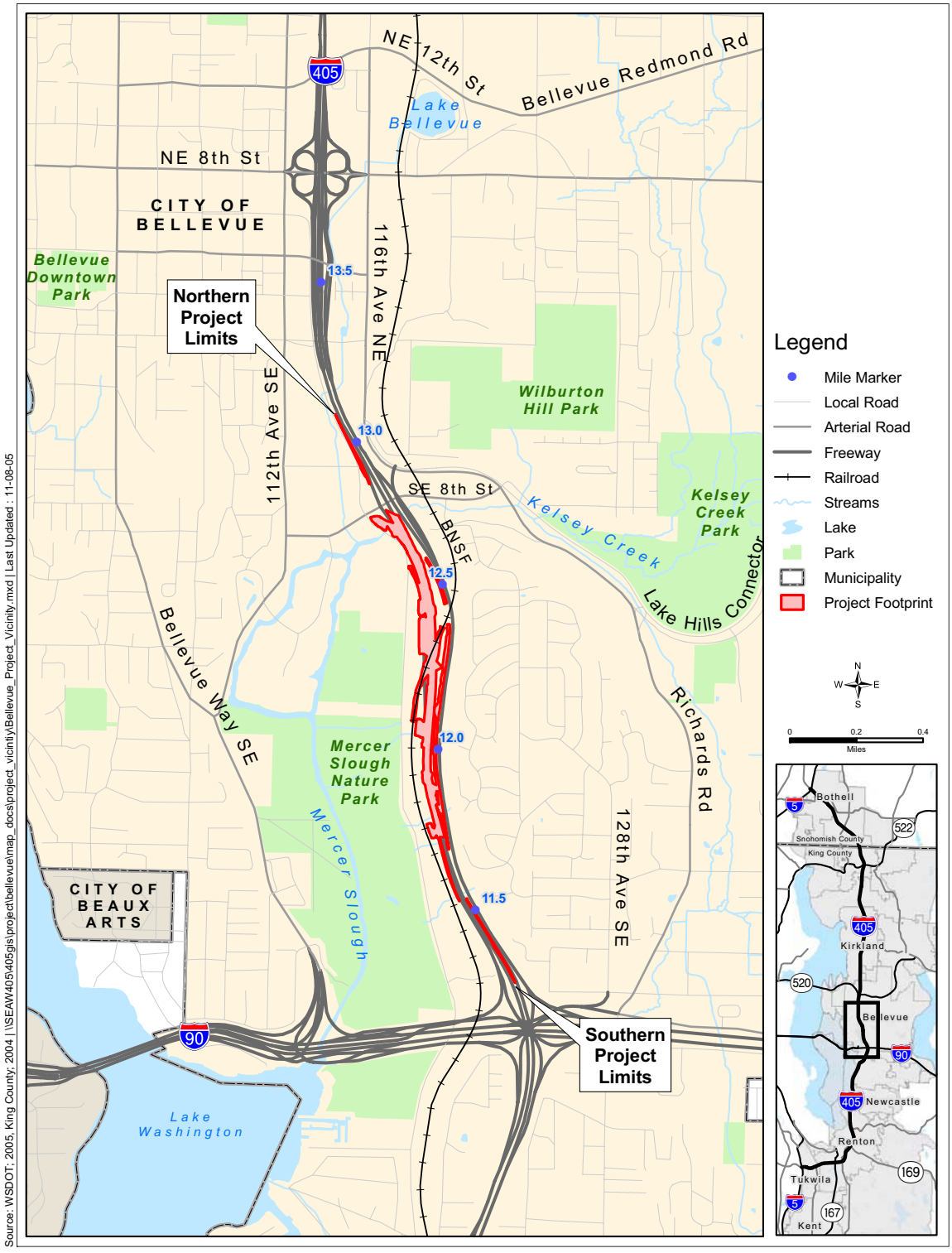
The ROD selected a project alternative that would widen I-405 by as many as two lanes in each direction throughout its 30-mile length. The ultimate configuration of the selected alternative includes buffers separating general-purpose lanes from parallel high-occupancy vehicle (HOV) lanes (potentially used by future high-capacity transit). The design also allows for expanded "managed lane" operations along I-405 that could include use of HOV lanes by other user groups, such as trucks.

In 2003, the Washington State legislature approved a statewide transportation-funding plan called the "nickel package." The nickel package provided funding for congestion relief projects in three critical traffic hotspots along the I-405 Corridor: Renton, Bellevue, and Kirkland. The Bellevue Nickel Improvement Project is one of several projects now moving forward as part of a phased implementation of the I-405 Corridor Program. Exhibit 1 shows the location of the Bellevue Nickel Improvement Project.

In 2003, the Washington State legislature approved a statewide transportation-funding plan called the "nickel package." The nickel package provides funding for congestion relief projects in three critical traffic hotspots along the I-405 Corridor, including Bellevue.

Traffic moving along I-405

Exhibit 1. Project Vicinity Map



In keeping with the direction established in the Final EIS and ROD, we are preparing a National Environmental Policy Act (NEPA) Environmental Assessment (EA) that focuses on project-level effects of constructing and operating the Bellevue Nickel Improvement Project.

The Environmental Assessment will describe new project changes, information, effects, or mitigation measures, but the assessment will not revisit the alternatives, impacts, and mitigation measures evaluated in the corridor-level EIS or the decisions documented in the *Record of Decision.*

We will base the EA on the analysis in the *I-405 Corridor Program Final EIS,* and will describe any new or additional project changes, information, effects, or mitigation measures not identified and analyzed in the corridor-level Final EIS (FEIS). The project-level EA for the Bellevue Nickel Improvement Project will not reexamine the corridor-level alternatives, impacts, and mitigation measures presented in the corridor-level FEIS, or the decisions described in the ROD.

What alternatives do we analyze in this discipline report?

This discipline report is one of 19 environmental elements WSDOT will study to analyze the effects of the Bellevue Nickel Improvement Project. All of the discipline reports will analyze one build alternative and one "no build" or "no action" alternative. This approach is consistent with FHWA's guidelines for preparing a NEPA EA.

What is the No Build Alternative?

NEPA requires us to include and evaluate the No Build Alternative in this discipline report. We use this approach to establish an existing and future baseline for comparing the effects associated with the Build Alternative. We assume the No Build Alternative will maintain the status quo: only routine activities such as road maintenance, repair, and safety improvements would occur within the corridor between now and 2030. The No Build Alternative does not include improvements that would increase roadway capacity or reduce congestion on I-405. We describe these improvements further in the Bellevue Nickel Improvement Project Traffic and Transportation Discipline Report.

We assume the No Build Alternative will maintain the status quo: only routine activities such as road maintenance, repair, and safety improvements would occur within the corridor between now and 2030.

What are the principal features of the Build Alternative?

The Bellevue Nickel Improvement Project will add one new general-purpose lane in each direction along a 2-mile section of I–405 between I-90 and SE 8th Street. We will generally use the

inside or "median" side of I-405 for construction. After we re-stripe the highway, the new lanes will occupy the outside of the existing roadway. The project also includes new stormwater management facilities and better drainage structures and systems.

Other project activities include developing off-site wetland mitigation as well as on-site stream mitigation areas to compensate for the loss of these resources within the project area. We expect project construction to begin in spring 2007 and the improved roadway to be open to traffic by fall 2009.

Improvements to Southbound I-405

We will add one lane in the southbound direction of I-405 from approximately SE 8th Street to I-90.

In the southbound (SB) direction, we plan to add one new travel lane from approximately Southeast (SE) 8th Street to I-90 (Exhibits 2, 3, and 4). In addition, the existing outside HOV lane at I-90 will be extended north so that it begins at the on-ramp from SE 8th Street. In order to add these lanes and maintain traffic flow during construction, we will shift approximately 3,000 feet of the SB roadway as much as 200 feet east into the existing median. The relocated SB roadway will connect to the existing SB travel lanes just north of the I-90 interchange, and south of the existing bridge over SE 8th Street.

We will build a new tunnel underneath the Burlington Northern Santa Fe (BNSF) railroad, just east of the existing Wilburton Tunnel, to accommodate the relocated and widened SB roadway. The existing tunnel does not have the capacity to accommodate additional lanes of SB traffic.

The existing SB travel lanes and the Wilburton Tunnel will remain open to traffic during construction of the new tunnel and the relocated/widened SB lanes. We will also build the new tunnel wide enough to accommodate additional lanes. The existing tunnel will remain after we complete the improvements.

Exhibit 2. Proposed Bellevue Nickel Project Improvements (Sheet 1 of 3)

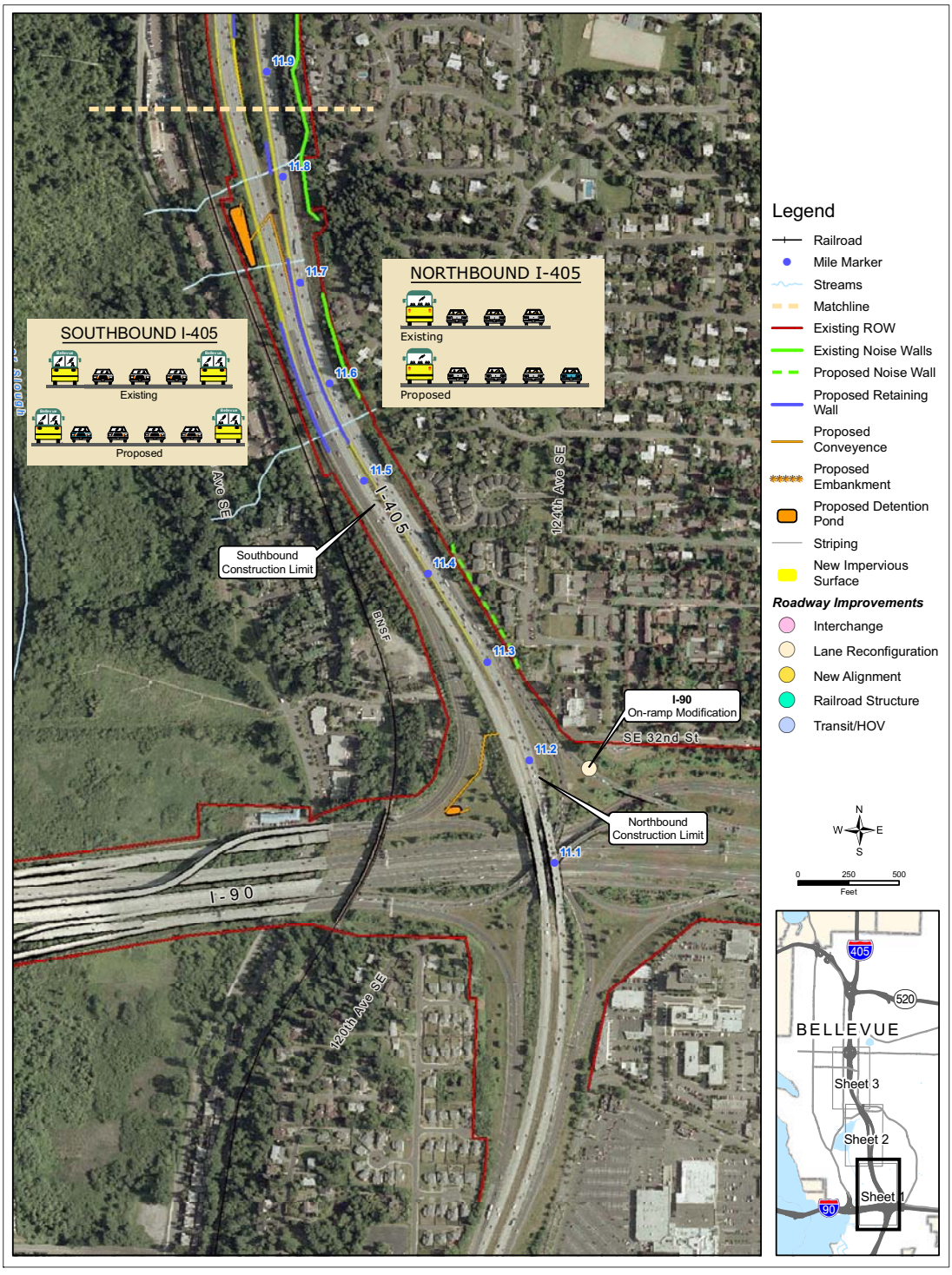


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Exhibit 3. Proposed Bellevue Nickel Project Improvements (Sheet 2 of 3)

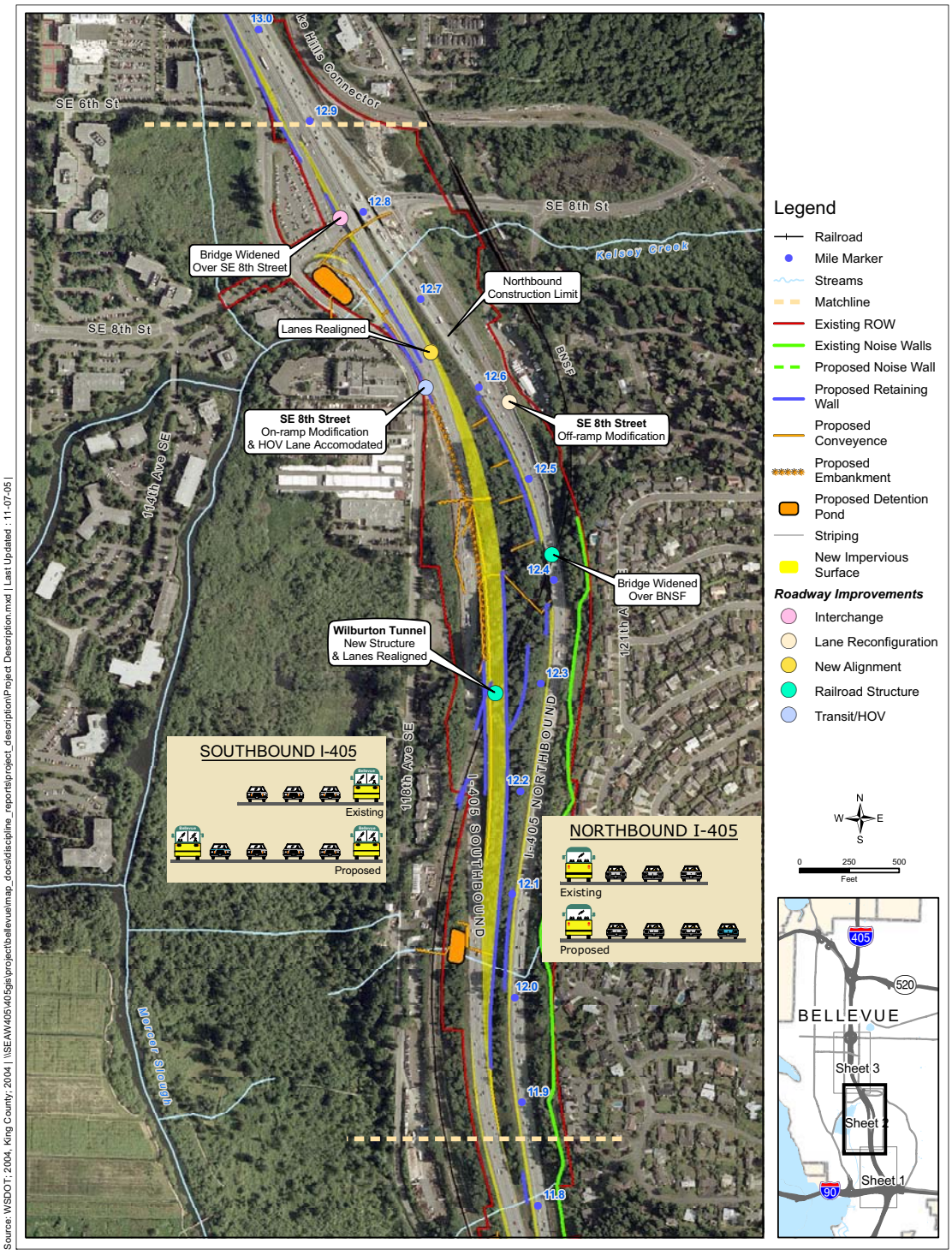

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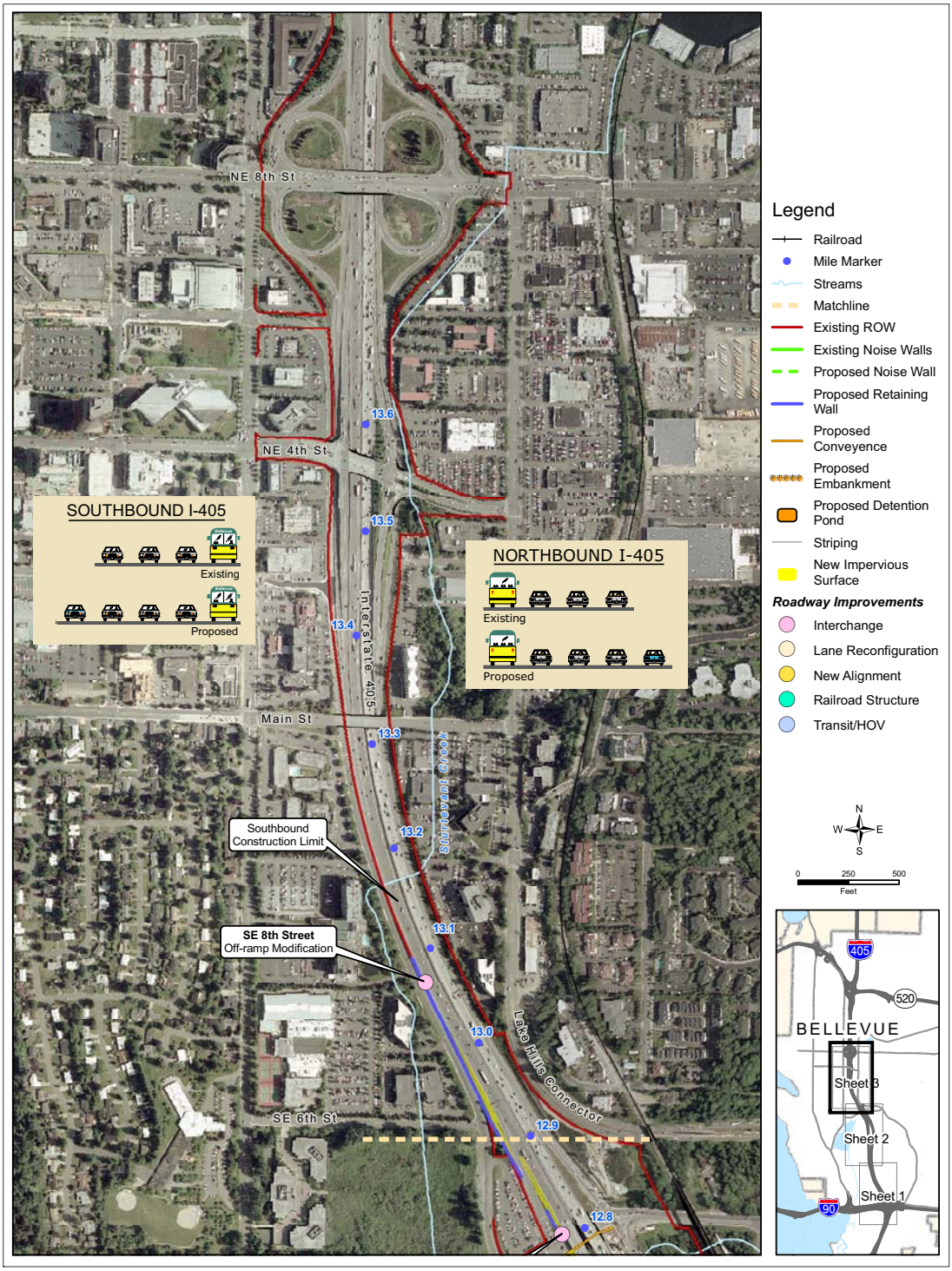
Exhibit 4. Proposed Bellevue Nickel Project Improvements (Sheet 3 of 3)



We will also include the following improvements in the Build Alternative:

- Modify the existing off-ramp at SE 8th Street to make room for an additional southbound lane on I-405. The off-ramp will then become a single-lane, optional off-ramp (i.e., the off-ramp will no longer be an "exit only" off-ramp).
- Build a retaining wall between the SB travel lanes and the off-ramp at SE 8th Street.
- Widen the existing bridge over SE 8th Street to the west to accommodate the new SB lane.
- Modify the existing on-ramp at SE 8th Street to tie into the relocated SB general-purpose travel lanes.
- Reconfigure the on-ramp at SE 8th Street to accommodate the extended outside HOV lane.
- Temporarily shift the existing BNSF railroad track from its current alignment to allow for continuous railroad operation during construction of the new tunnel.
- Construct retaining walls along the eastern edge of the relocated SB travel lanes.

Improvements to Northbound I-405

We will add one lane in the northbound direction of I-405 from approximately I-90 to SE 8th Street. All widening of the northbound mainline will occur on the inside (median side) of the existing roadway.

In the northbound (NB) direction, we plan to add one new travel lane from approximately I-90 to SE 8th Street (Exhibits 2, 3, and 4). We will add one new lane to the NB ramp from I-90. We will shift the NB lanes to allow all of the proposed widening to occur on the inside, or median side of the existing roadway.

Additional improvements include:

- Re-stripe the westbound/eastbound I-90 on-ramp to NB I-405 resulting in one lane becoming two lanes in the NB direction.
- Widen, shift, and re-stripe NB I-405 travel lanes north of I-90 to allow the westbound I-90 to NB I-405 on-ramp and the eastbound I-90 to NB I-405 on-ramp to enter I-405 without having to merge into a single lane.
- Construct several retaining walls needed for road widening in locations that allow for existing and future widening of I-405.

- Construct a noise barrier approximately 725 feet long and 16 feet high (See Exhibit 2).
- Widen the existing bridge over the BNSF Railroad to the west to accommodate the new NB lane.
- Modify the NB off-ramp to SE 8th Street to make it a single-lane "exit-only" off-ramp.
- Transition the NB travel lanes back into the existing lane configuration before crossing over SE 8th Street.

Improvements to the Stormwater Management System

Managing stormwater for the I-405 Bellevue Nickel Improvement Project involves the collection and treatment of rainfall runoff from the new project pavement consistent with the guidelines in the WSDOT Highway Runoff Manual.

Currently, we treat less than 5 percent of the existing runoff from paved surfaces in the project area before discharging it. We will improve this condition by treating 17 percent more area than the new paved surface area we create. By treating a greater area, we improve flow control and remove pollutants from a portion of the existing roadway as well as from newly constructed areas.

Reconfiguration and new construction associated with the SB lanes will mean that we need to replace much of the existing drainage system. We will continue to use open roadside ditches along the shoulders of the roadway shoulders where possible. We will use standard WSDOT catch basins and manhole structures to move the roadway runoff to a system of stormwater drain pipes. These features will transport runoff to treatment and flow-control facilities within the existing ROW.

We will construct three new stormwater ponds (detention ponds combined with stormwater treatment wetlands) as part of the project and enlarge the existing pond at SE 8th Street. Two of the new ponds will be located south of the Wilburton Tunnel between the SB lanes and the BNSF railroad ROW. We will construct the third new pond in the northwest quadrant of the I-90/I-405 interchange. The project will discharge treated stormwater following existing flow patterns to Mercer Slough or to the wetlands that surround it.

Best Management Practices (BMPs)

BMPs are generally accepted techniques that, when used alone or in combination, prevent or reduce adverse effects of a project. Examples include erosion control measures and construction management to minimize traffic disruption. Please see Appendix A for a complete list of BMPs.

WSDOT Standard Specifications

Guidelines and procedures established by WSDOT for roadway design and construction in a variety of design, engineering, and environmental manuals.

Avoidance and Minimization Measures

WSDOT will use Best Management Practices (BMPs), WSDOT Standard Specifications, and design elements to avoid or minimize potential effects to the environment for the Bellevue

Nickel Improvement Project. Collectively, these measures to avoid or minimize potential effects to the environment are known as "avoidance measures." We describe these measures in more detail in an Appendix A. If the Bellevue Nickel Improvement Project has additional effects not addressed in the avoidance measures, we will address these measures through mitigation.

Wetland and Stream Mitigation Sites

We will compensate for adverse effects to wetlands and their buffers by creating just over an acre of wetland within the boundaries of Kelsey Creek Park (Exhibit 5). The site is located north of the intersection of Richards Road and the Lake Hills Connector.

Our general concept will be to create an area that will transition from forested land beside the Lake Hills Connector to wetlands within Kelsey Creek Park. We will reshape the surface area to create favorable conditions for the necessary wetland aquatic characteristics, and we will replant and enhance habitat in the area by constructing habitats and replanting adjacent roadside areas with forest-type vegetation.

Similarly, we will compensate for unavoidable effects to "Median Stream," the unnamed stream within the I-405 median. We have developed a conceptual stream mitigation plan that includes on-site habitat restoration and creation. The conceptual stream mitigation plan includes the following specific elements (See Exhibit 6):

- Connect the new Median Stream culvert under I-90 to the existing channel and wetland located west of SB I-405.
- Create approximately 500 linear feet of stream channel along the western slope of SB I-405.
- Buffer the created stream channel with approximately 16,000 square feet of native streamside vegetation.
- Enhance approximately 300 linear feet of riparian habitat west of SB I-405 by removing selected non-native invasive plant species and replacing with native streamside vegetation.

We provide more detailed information about mitigation efforts planned in conjunction with the Bellevue Nickel Improvement in the Surface Water, Floodplains, and Water Quality, and Wetlands Discipline Reports.

Exhibit 5. Proposed Wetland Mitigation Area

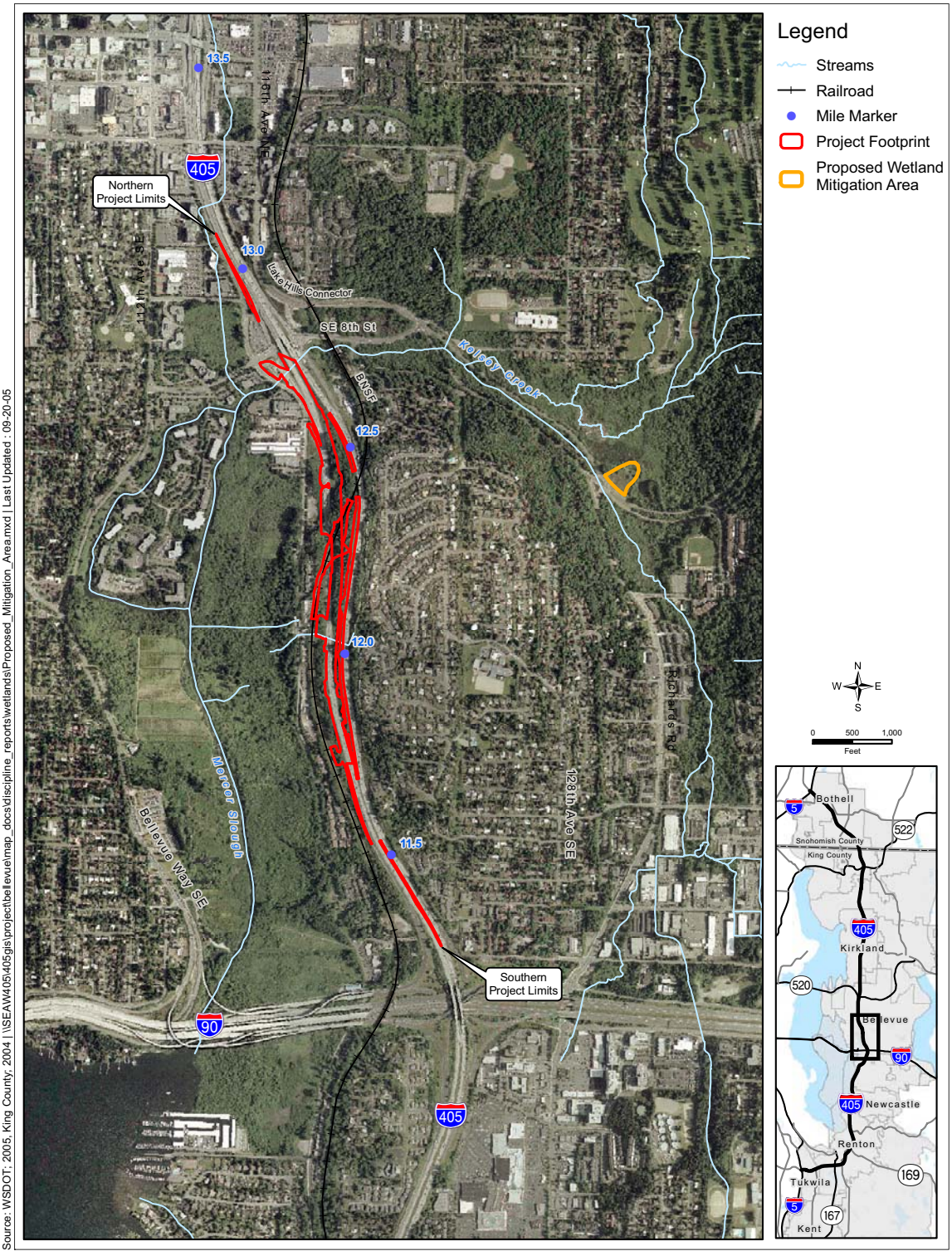
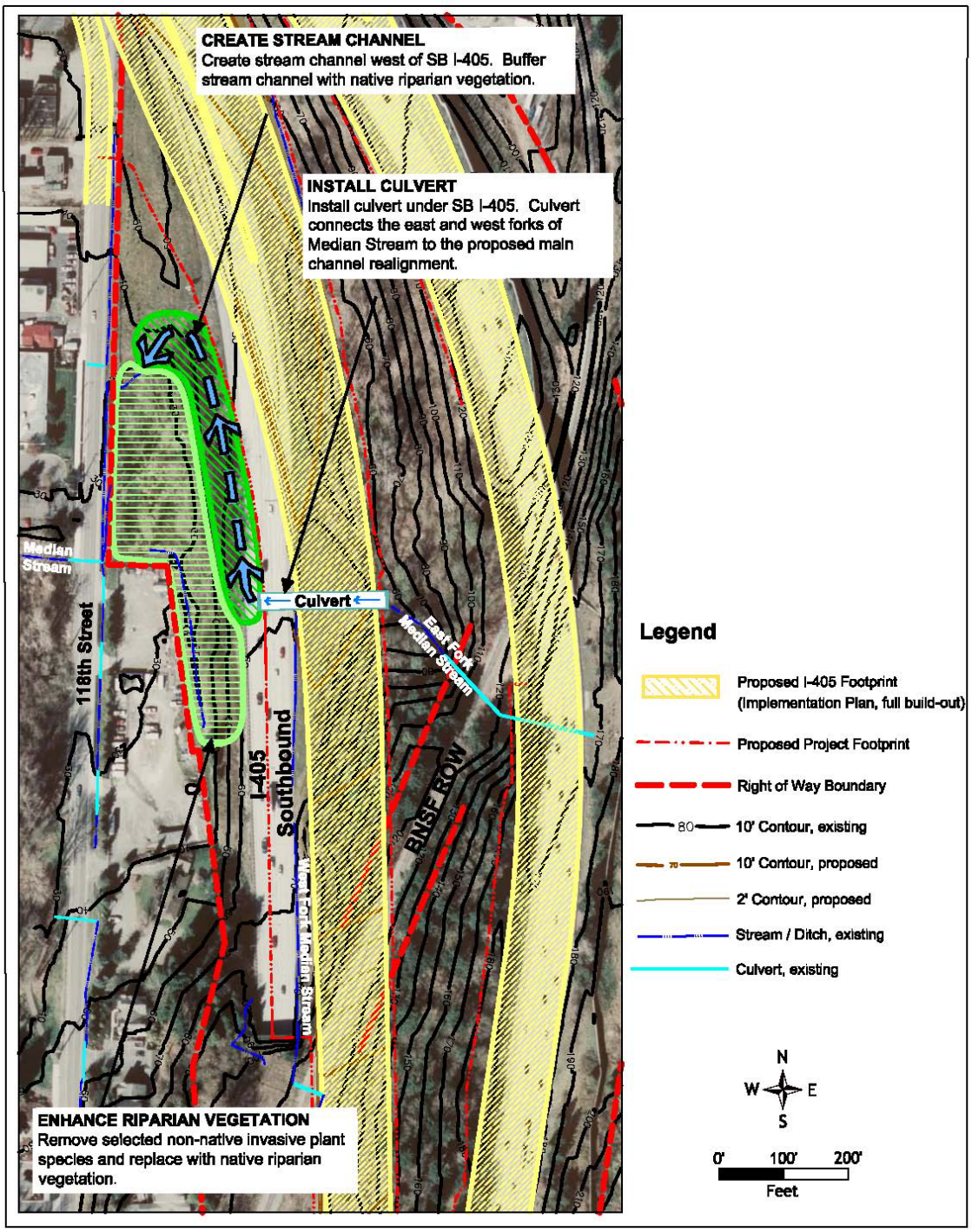


Exhibit 6. Conceptual Stream Mitigation Plan



Why do we consider traffic and transportation as we plan this project?

We need to understand the likely effects of transportation improvements to I-405 before we can efficiently design for them and get approvals from federal agencies. In this report we present the results of our detailed study on the likely effects of the project.

What are the key points of this report?

- The existing 2002 peak travel directions of I-405 between I-90 and SE 8th Street are congested during the peak hours; northbound lanes in the morning and in the southbound lanes in the afternoon. The Bellevue Nickel Improvement Project will increase the number of vehicles traveling through the area and improve travel speeds up to 15 miles per hour when it opens in approximately 2010.
- The Bellevue Nickel Improvement Project will improve travel speeds outside of the peak travel period for several years.
- The Bellevue Nickel Improvement Project will improve safety in the study area. The new northbound I-405 lane will remove the high-speed merge where the eastbound and westbound I-90 ramps come together before entering northbound I-405. The project will also reconstruct the Wilburton Tunnel on southbound I-405 and widen the existing narrow shoulders in the tunnel to design standards.
- The project extends the southbound I-405 HOV off-ramp to westbound I-90 north to the SE 8th Street on-ramp. This modification provides a direct HOV connection from SE 8th Street to the westbound I-90 HOV lane via I-405, improving transit and HOV travel time.
- Projected future regional population and employment growth in the region will increase freeway demand compared to existing conditions. As traffic volumes increase over time, the benefits of the project will decrease during the morning and afternoon peak travel periods.
- The future increased demand amplifies congestion in locations where I-405 is already at capacity. By 2014, with or without the project, the freeway speeds fall and a smaller

I-405 plays a critical role in the regional movement of people and freight.

Throughput

The number of vehicles carried on a facility. We usually measure throughput at a specific point on the roadway facility for a predeterminedperiod of time.

number of vehicles actually travel through the study area compared to conditions today.

- In the year 2014, the Build Alternative modestly improves freeway travel speeds and increases vehicle throughput compared to the No Build Alternative. Bottlenecks north and south of the study area limit the benefits of the Bellevue Nickel Improvement Project. These problem areas are beyond the scope of the Bellevue Nickel Improvement Project.
- The Bellevue Nickel Improvement Project improves a portion of the I-405 corridor. It will not offer the full solution for the I-405 corridor but it is the first step in implementing the long term plan (Master Plan) for the I-405 corridor. The Master Plan includes additional freeway and transit capacity and will substantially replace and upgrade interchanges along the entire length of the I-405 corridor. Coupled with the other Master Plan improvements on I-405, the Bellevue Nickel Improvement Project will substantially improve travel speeds and throughput.